



A Review of Global Data on Escapes from Open Net Cages Using Farmed Salmon as a Case Study

Pure Salmon Campaign

Presentation to the National Organics Standards Board (NOSB)

November 27, 2007

Specific NOSB Questions

- 1) **How can net pens be ecologically responsible?**
What requirements need to be included in the proposed regulation to assure this? How can the issues of water flow and rotational locations be included? What are the other issues?

- 3) Escape: **What is the current rate of escape in the conventional aquaculture and developing organic aquaculture industry?** How can the issue of escape be better controlled in an organic system than in a conventional ocean-based system? Are there any implications to containment farming of fish species not indigenous to that geographic area other than cross-breeding with native species?

International Inventory of Escapes

May aid the NOSB in considering:

- ⊙ The **rate** of escapes from open net cage systems
- ⊙ The **trend** in escapes over time
- ⊙ The **causes** of escapes
- ⊙ The **ability** of open net cage systems **to control** escapes
- ⊙ The rate of escapes from emerging **organic** operations
- ⊙ The **potential of proposed organic standards** control escapes from open net cages

Likely, A Conservative Estimate

- ⊙ Incomplete data set for most regions
- ⊙ Self-reported data
- ⊙ Possible underreporting
- ⊙ Doesn't include "leakages"
- ⊙ Only includes farmed salmonids, for the most part
- ⊙ Does not include 2007 data

Rate of Escapes

Region	Year	Reported Escapees	Average Escape Ratio
Norway	2001 -2006	3,815,229	1:331
Chile	1995 -1996; 2002; 2004-2005	2,820,444	1:626
Scotland	2001-2006	1,935,734	1:304
British Columbia	2001-2005	119,711	1:195,158

Rate of Escapes

Escape Rate of Cod and Other Fish Even Higher

Species	2006 Norwegian Reported Escapees	2006 Norwegian Escape Ratio
salmon/trout	882,229	1:160
cod	272,422	1:12
Other marine species	15,536	1:50

Rate of Escapes

Organic Farms Report Escapes

A comparison of Soil-Association “Organic” Salmon Farm Sites to SEPA data 2002 -2006 suggests:

- **12 escape incidents**
- **122,962 reported escapees**
- **About 1% recaptured**
- **No production data - Could not calculate escapes rate**

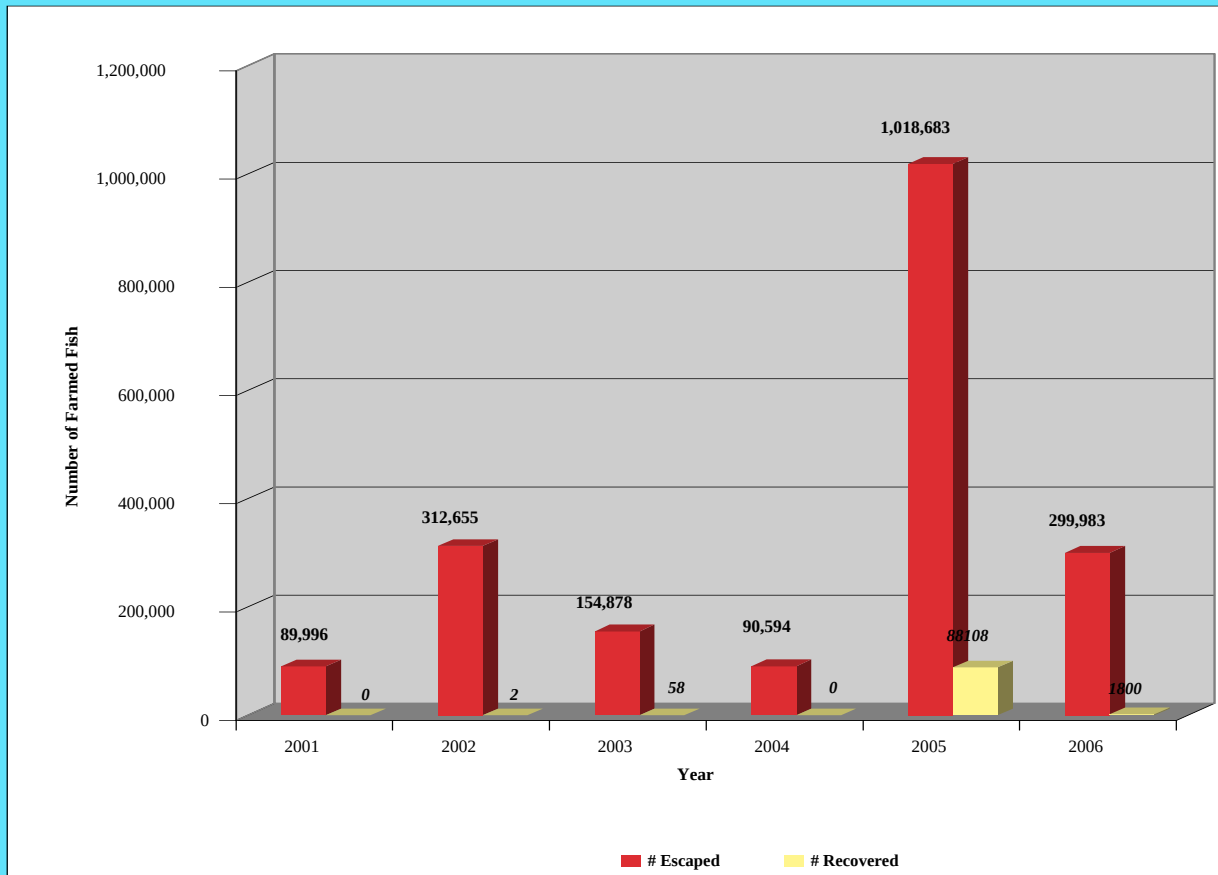
Causes of Escapes

Region	Year	Major Causes of Escapes	% of Escapes
Norway	2001-2006	Plant Failure	53
		Collision	13
		Others	12
Scotland	2002-2006	Weather	28
		Predator	23
		Equipment Failure	20
Chile	2004 -2005	Net breakage	36
		Storm/Wind & Rain	29
Australia	2000-2007	Unknown	40
		Net tear/Hole	33
		Storm	20

Concerning Trends in Escapes

Successful Recapture is Virtually Impossible

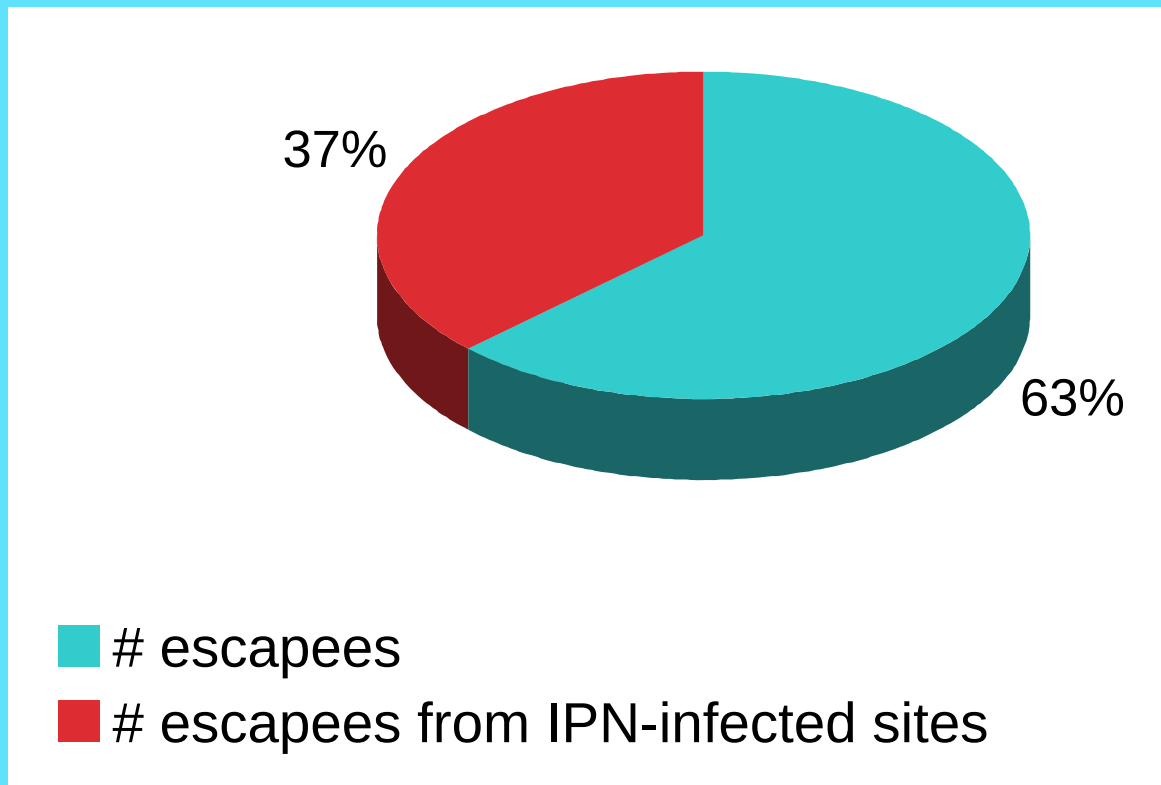
Scottish Reported Escapes of Marine Finfish Versus Recovered 2001 -2006



Concerning Trends in Escapes

60% of Scottish Escapees from IPN-Infected Sites

Reported Escapees from IPN-Infected Scottish Farm 2000-2005



Concerning Trends in Escapes

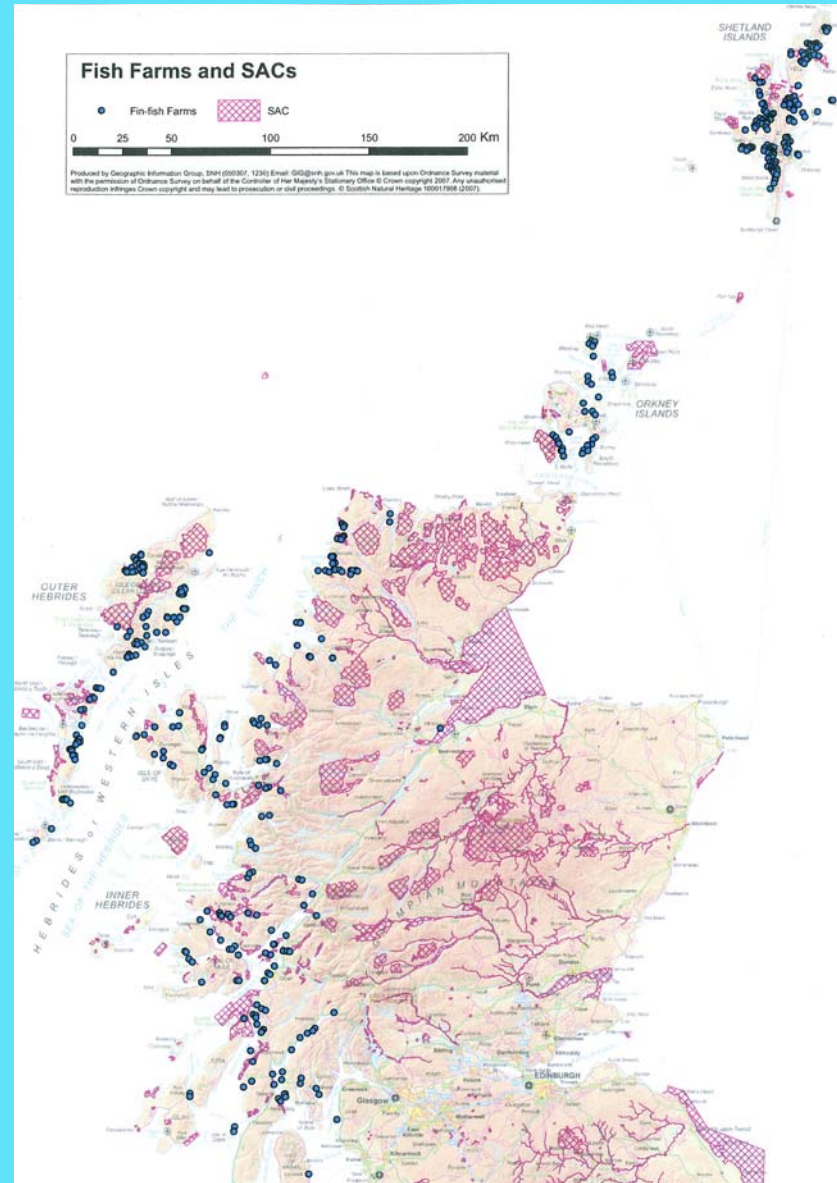
Escapes of Chemically-treated Salmon

Chemically-Treated Escapes from Scottish Atlantic Salmon Farms

Year	# Escapees	# from site treated with Emamectin	# from site treated with Cypermethrin	# from site treated with Oxytetracycline
2002	312,655	8,647	0	0
2003	151,853	16,001	500	0
2004	90,594	15,946	0	0
2005	1,018,683	51,953	3,000	0
2006	287,753	24,318	0	1,950

Concerning Trends in Escapes

Escapes in Special Areas of Conservation



Key Observations

- ⊙ Escapes continue to occur in every major producing region
- ⊙ Norway reported 1.2 million escapes of farmed fish in 2006, despite a zero escapes policy
- ⊙ Failure of equipment and weather are the leading causes of escapes
- ⊙ Less than 2% of escapes are recaptured, on average
- ⊙ Escapes occur from diseased and chemically-treated sites
- ⊙ New species are escaping at a higher rate (Norwegian data)
- ⊙ Escapes occur from UK organic sites, despite organic standards

Scientific Literature

- Significant ecological and genetic impacts on native wild fish populations.
- Risk of increased disease outbreak and decreased immunity of wild fish to disease.
- Link of open net cage salmon farms with sea lice infestations on wild fish populations.
- Escapes from other species grown in open net cages such as cod, halibut, sea trout, kingfish and bream are an emerging international issue

**Principle 15 of the
1992 Rio Declaration on
Environment and Development:**

“Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent degradation.”

Important Questions for Proponents

International data suggests it is impossible to eliminate all escapes from open net cages, therefore:

- ⊙ How many escapes are “too many”? Or, what number of escapes is too high? At what level are escapes a threat to wild fish populations?

If the farming of natives only is suggested as a solution, then:

- ⊙ Are the potential increased genetic and disease risks inherent with culture of native species preferable to the potential genetic and ecological impacts associated with culture of exotic species?

Is there or can there ever be peer-reviewed science to support the answers?

Important Questions for Proponents

It is impossible to ensure that open net cage fish will not contract diseases, therefore:

- ⊙ Is there certainty that diseases and parasites will be **effectively treated and fully-contained to an infected fish or farm site** using treatments available within organic standards?
- ⊙ Can we guarantee that diseases, including sea lice, will not spread from organic open net cage fish to wild fish?
- ⊙ What data are available showing that organic pollution from farms are not and will not drive additional disease/parasite burdens on wild fish?